

SAFETY BRIEF

Number 1

Terrain Avoidance Plan

Since 1993 there have been over 380 fatal night VFR accidents. This ASF Safety Brief explains how you can use readily available information on VFR and IFR charts to avoid obstacles and terrain when flying.

Avoiding terrain and towers, especially at night or in low visibility, is easier if altitudes already shown on VFR and IFR charts are used as part of your preflight planning. Obviously, ceilings must be at least 500' above your cruising altitudes when in Class E airspace.

Within the quadrangles of latitude and longitude shown on this IFR enroute low altitude chart the Off Route Obstruction Clearance Altitude (OROCA) is 3,500 feet.



Figure 1: IFR enroute low altitude chart showing an OROCA of 3,500 feet.

This altitude guarantees 1,000-foot obstacle clearance in non-mountainous terrain and can be used at night or when visibility is reduced to ensure obstacle clearance.

The Minimum Enroute Altitude (MEA) highlighted on this chart is 6,000 feet. This altitude meets obstacle clearance requirements and provides acceptable ground based navigation signal coverage.

The Minimum Obstruction Clearance Altitude (MOCA) highlighted is 3,000 feet. On government charts this altitude is shown with an *. MOCA is the lowest altitude between two fixes that meets obstacle clearance requirements. This altitude only assures an acceptable ground based navigation signal within 22 nautical miles of a VOR. Satellite based navigation systems, like GPS, will still receive navigation signals at these altitudes. OROCA, MEAs, and MOCA are found on IFR enroute low altitude charts. (Figure 1)

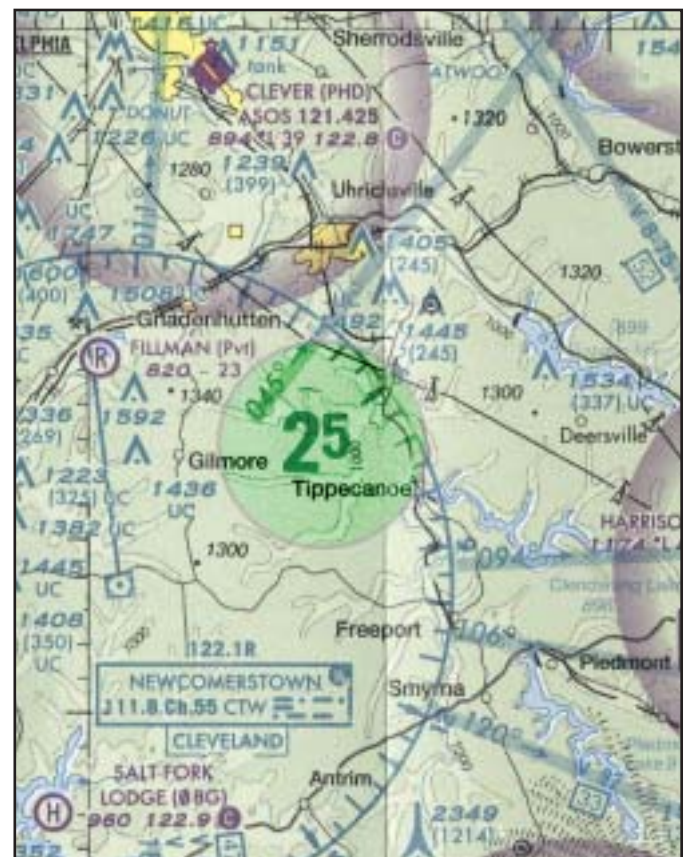


Figure 2: VFR sectional chart showing a MEF of 2,500 feet.

On the VFR sectional in figure 2, the Maximum Elevation Figure (MEF) in this area is 2,500 feet. This altitude represents the highest elevation, including terrain and other vertical obstacles bounded by lines of latitude and longitude. MEFs are only found on VFR sectional charts. MEFs may provide as little as 101 feet of obstacle clearance and are much less conservative than using the OROCA, MEA, or MOCA. (Figure 2)

The OROCA highlighted in figure 3 is 12,000 feet. This altitude offers 2,000 feet of obstacle clearance in mountainous terrain and can be used at night to ensure

obstacle clearance. The only other altitude offered on this IFR enroute low altitude chart segment is an MEA. (Figure 3)

The MEF in figure 4 is 9,700 feet. MEFs are determined by rounding the highest elevation within the quadrangles to the next 100-foot level. These altitudes are then adjusted upward between 100 to 300 feet. **Recognize this could give a pilot as little as 101 feet of obstacle clearance.** Note the highest peak on this VFR sectional segment is 9,396 feet. (Figure 4)

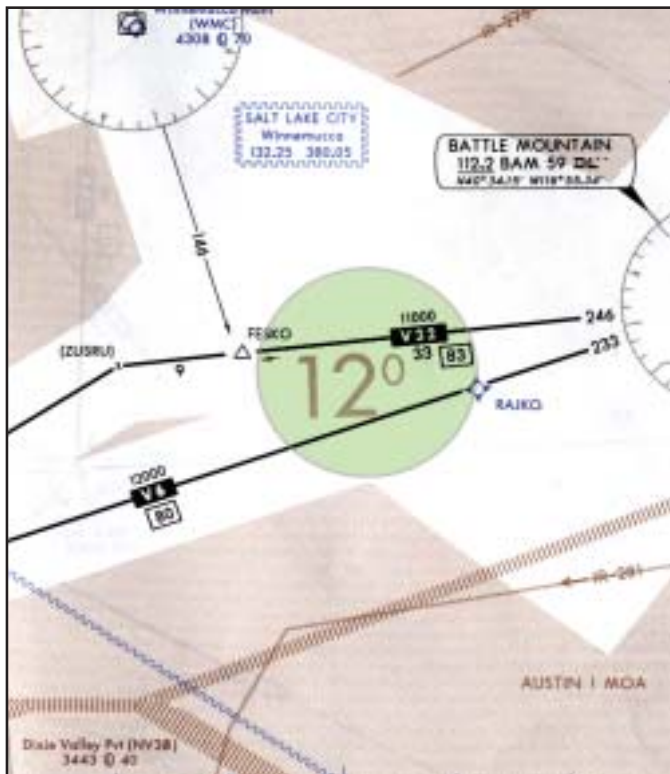


Figure 3: IFR enroute low altitude chart showing an OROCA of 12,000 feet.

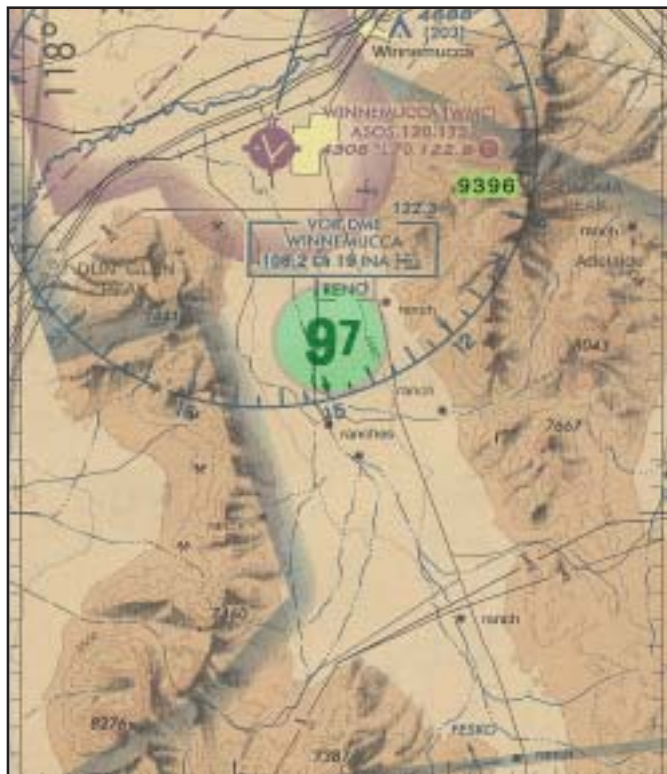


Figure 4: VFR sectional chart showing a MEF of 9,700 feet.

Try the Obstacle Clearance ASF Safety Quiz to test your new skills by visiting
www.aopa.org/asf/oshquiz.html

Learn more on this topic by reading Beware the Dark Side available at
www.aopa.org/asf/asfarticles/2004/sp0407.html

To read accident analysis reports on night VFR accidents visit www.aopa.org/asf/safety_db.html.
 This research was funded by the generous support of the Emil Buehler Trust.

© Copyright 2004, AOPA Air Safety Foundation
 421 Aviation Way, Frederick, MD 21701 • 800-638-3101 • www.asf.org • asf@aopa.org

Publisher: Bruce Landsberg • Editors: Kevin D. Murphy, David Wright
 Writer: Leisha Bell • Intern: Bill Mastick

SB01-07/04